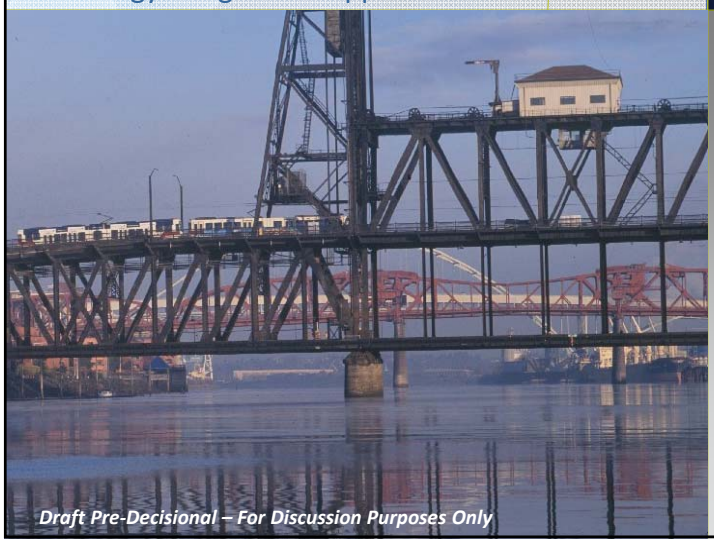
Portland Harbor Feasibility Study

US EPA and LWG Discussion

Technology Assignment Approach



US EPA
Oregon Operations Office
Portland, Oregon

Via Webinar

April 1, 2014
9 AM to 1 PM PDT

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Technology Assignment – LWG Approach (Integrated and Removal)

Table 7.2-1. Application of Technologies by subSMA Type for Comprehensive Alternatives

Sub SMA Type	SubSMA Label	SubSMA Description	Removal Focused	Integrated Cost Estimate A (1)	Integrated Cost Estimate B (2)
Channel	NC	Areas within the current federally authorized navigation channel	Removal	Removal	Removal
	FMD	Approach areas located between the NC areas and docks where shipping access is needed now or in the future	Removal	Removal	Removal
Structure	SS	Areas located beneath structures including a 5-foot offset from the structure face. The offset is based on the average DOI across the Study Area.	Cap	Cap	In situ Treatment
	SL	Areas where open water equipment is not accessible due to structures. Smaller water-based equipment would have to be used.	Removal	Cap	In situ Treatment
	SU	Areas where water-based equipment cannot reach but access from shore is feasible	Removal	Cap	In situ Treatment
	SN	Areas where no water-based equipment can reach and upland structures, utilities, and/or topography prevent access from shore	Cap	Cap	In situ Treatment
Other	OW	Areas where there is no restrictions to dredging or capping equipment	Removal	Cap	In situ Treatment
	-wz	Area above 0 NAVD88 subject to wind/wake waves.	Removal	Cap	Cap

Note:

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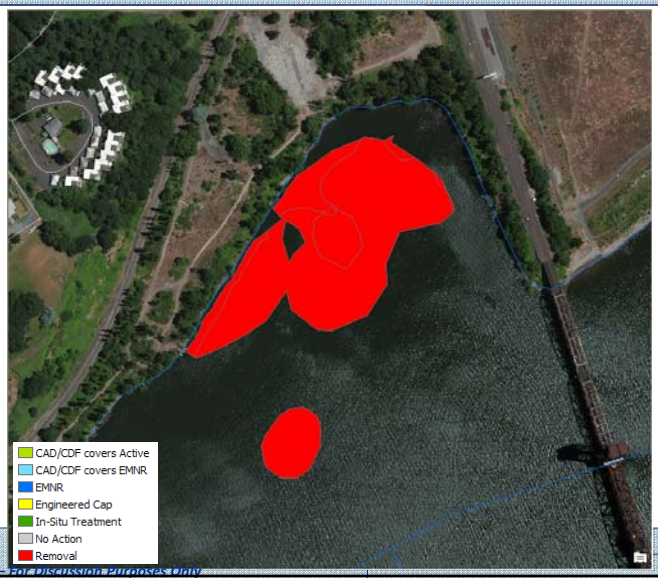
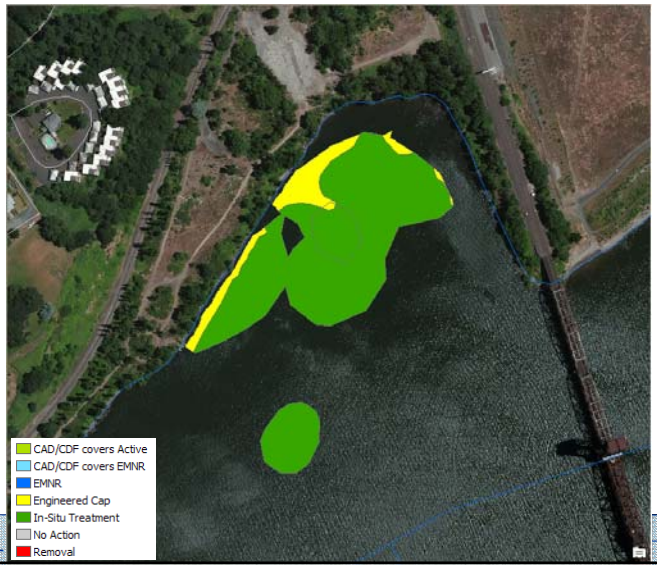
Assignment of Technologies (From FS)

- Where integrated options include in-place technologies, this refers to a suite of potential in-place technologies [EMNR, AC placement, or engineered caps].
- For all evaluations in this draft FS, integrated alternatives are assumed to involve the cost estimate variation that emphasizes in situ treatment.
- The "in situ treatment" option evaluated for the integrated alternatives throughout the remainder of this draft FS can be viewed as in situ treatment and/or EMNR.
- The assumed process option for in situ treatment is direct broadcasting of AC onto the sediment surface and incorporation via ambient mixing processes (e.g., bioturbation).

Willamette Cove Area LWG Alt E Removal Focused



Willamette Cove Area LWG Alt E Integrated Focused



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Issues with Draft FS approach

- Selection of technologies does not assess whether environmental conditions are conducive to or consistent with the technology
  - For example, in-situ treatment (application of activated carbon) can be selected in erosive or high slope areas
- Outside the nav. channel/fmd, the remedial options are essentially “all dredging” or “all in-situ”
  - A choice between 100% dredge or 100% in-situ
- National Guidance emphasizes combination remedies and selection of technologies based on environmental conditions

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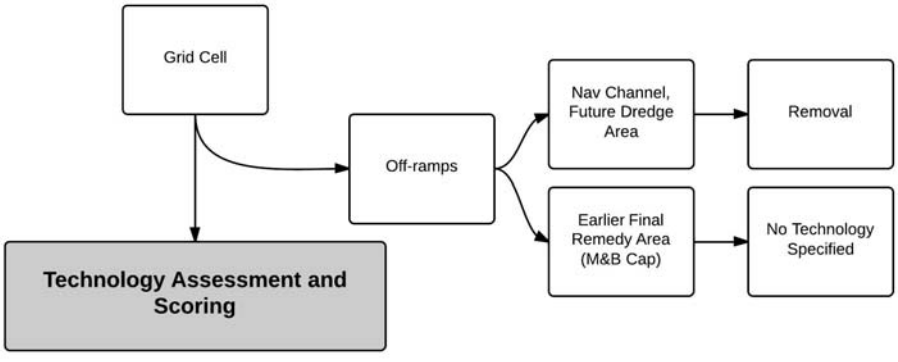
EPA Approach: Introduction

- **Objective:** Develop a process that evaluates remedies based on environmental conditions:
  - hydrodynamics, sediment bed characteristics, and anthropogenic conditions
- Uses a decision tree / multi-criteria decision approach to indicate an appropriate technology:
  - EMNR/insitu treatment
  - Cap – engineered cap with/without active component
  - Dredging (or Dredge/Cap)
- **Outcome:** Process indicates appropriate technology based on analysis… **It does not select a remedy**.

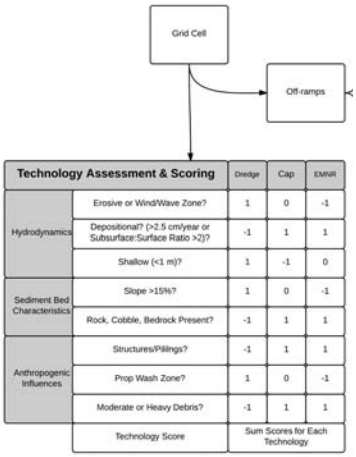
Overview of Technology Assignment Process: Off-ramps



Overview of Technology Assignment Process: Technology Assessment and Scoring

Purpose: Develop objective and reproducible method for indicating appropriate remedial technologies based on environmental conditions.

- Evaluates and scores technology on the basis of multiple criteria (lines of evidence)
  - Hydrodynamics
  - Sediment bed characteristics
  - Anthropogenic conditions
- Criteria and scoring drawn from 2005 Sediment Guidance, USACE Dredging Guidelines, and others.

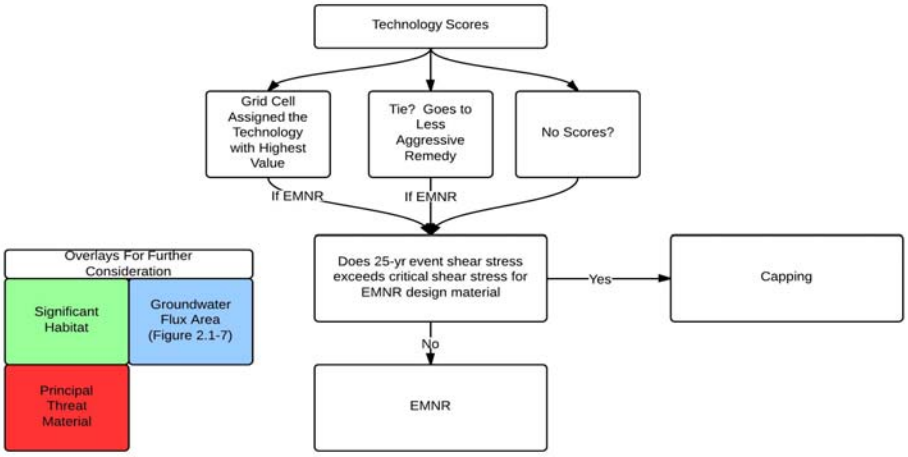


Overview of Technology Assignment Process: Technology Assessment and Scoring

- +1 = criteria is consistent with or conducive to use of technology
- 0 = criteria in neutral to use of technology
- -1 = criteria is inconsistent or not conducive to use of technology

Technology Assignment Matrix		Dredge	Cap	EMNR
Hydrodynamics	Erosive or Wind/Wave Zone?	1	0	-1
	Depositional? (>2.5 cm/year or Subsurface:Surface Ratio >2)?	-1	1	1
	Shallow (<1 m)?	1	-1	0
Sediment Bed Characteristics	Slope >15%?	1	0	-1
	Rock, Cobble, Bedrock Present?	-1	1	1
Anthropogenic Influences	Structures/Pililngs?	-1	1	1
	Prop Wash Zone?	1	0	-1
	Moderate or Heavy Debris?	-1	1	1
	Technology Score	Sum Scores for Each Technology		

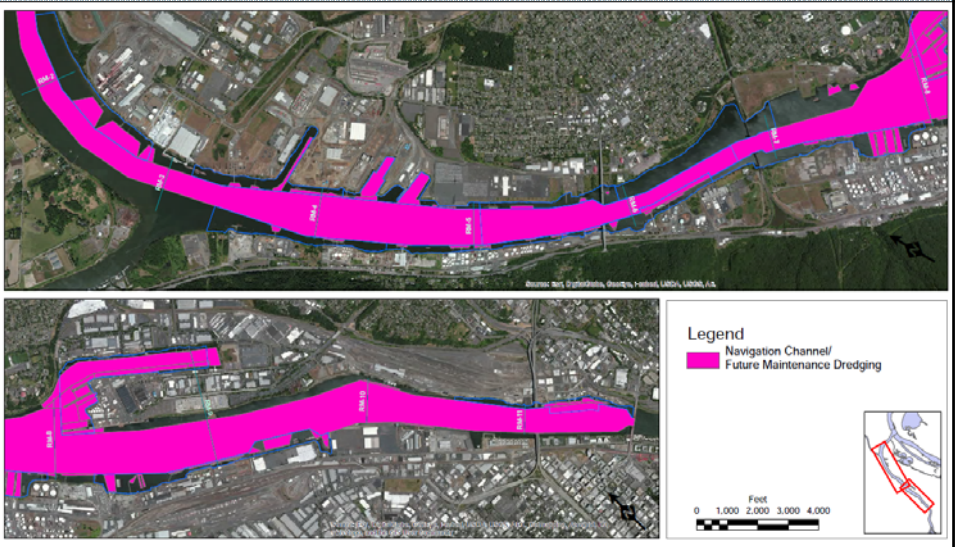
Overview of Technology Assignment Process: Scoring and Assignment



Focus on Individual Layers

- Two "off-ramps"
  - Navigation channel or future maintenance dredging
  - Final remedy area (McCormick & Baxter)
- Eight criteria/LoEs in matrix
  - Depositional?
  - Erosional?
  - Shallow?
  - Slope?
  - Rock, Cobble…?
  - Structures?
  - Propwash?
  - Debris?

Nav Channel/Future Maintenance Dredging



Navigation Channel/Future Maintenance Dredging

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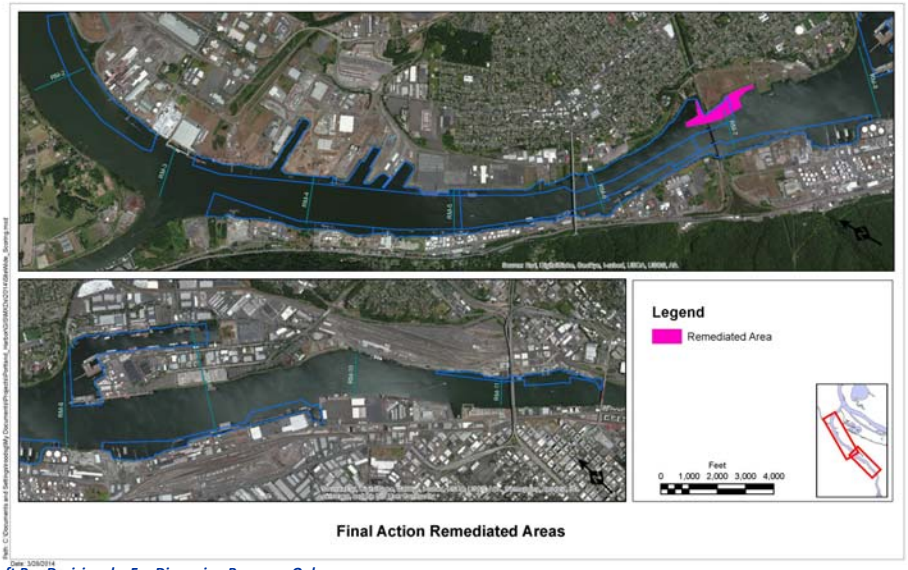
Final Action Remediated Areas



Final Action Remediated Areas

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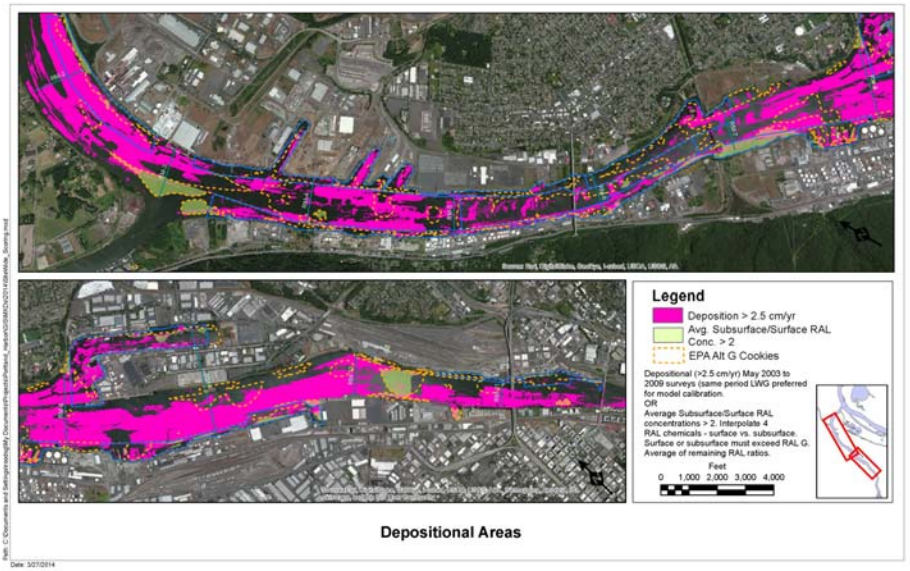
Hydrodynamics – Depositional



Depositional Areas

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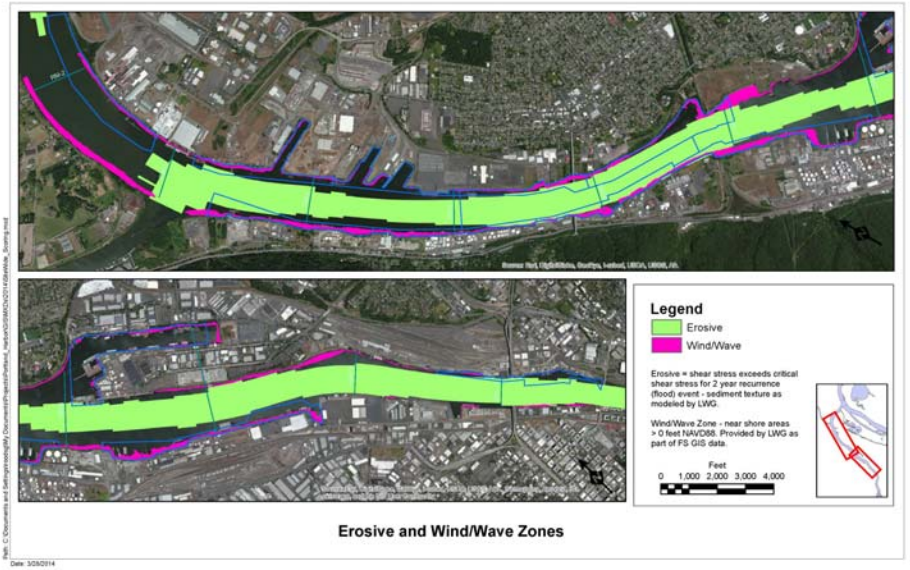
Hydrodynamics – Erosive or Wind/Wave Zone



Erosive and Wind/Wave Zones

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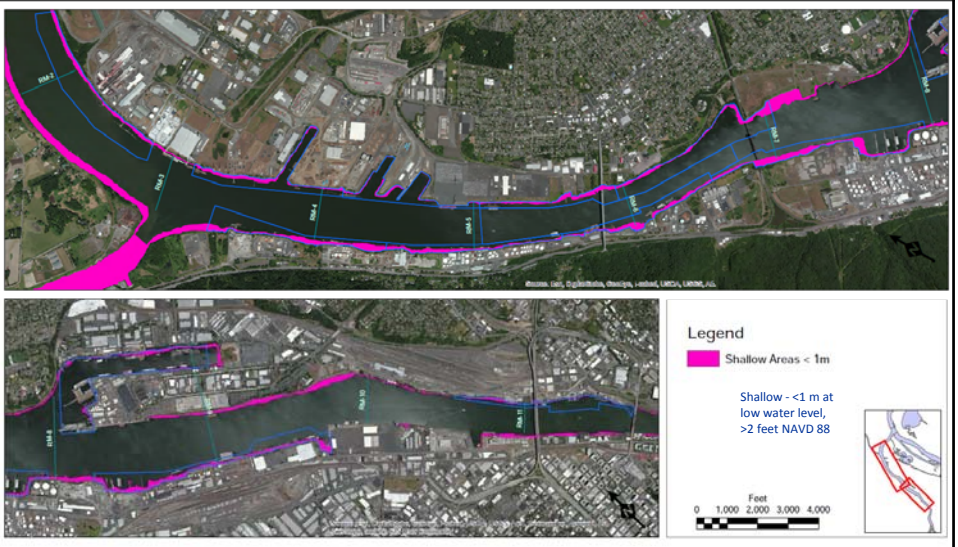
Hydrodynamics – Shallow Areas



Shallow Areas

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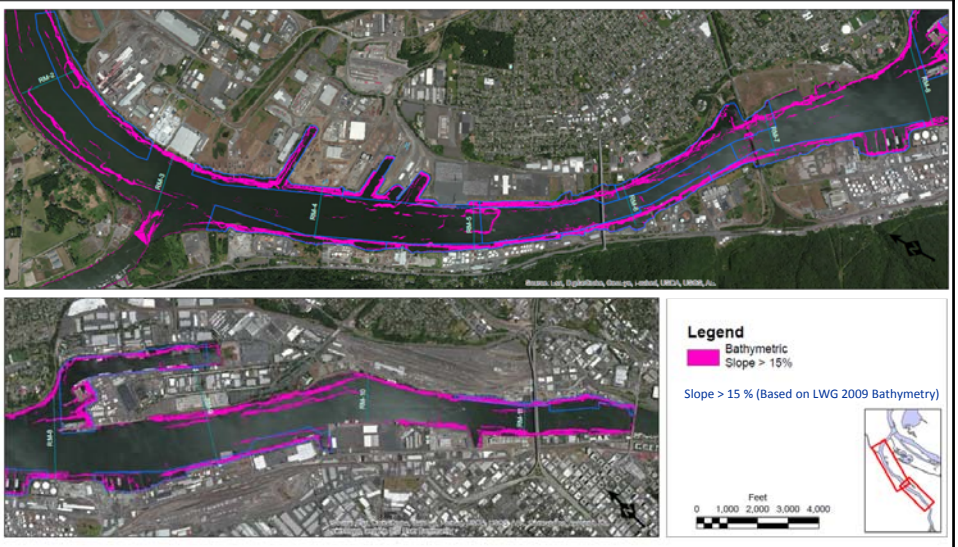
Sediment Bed Characteristics – Bathymetric Slope



Bathymetric Slope

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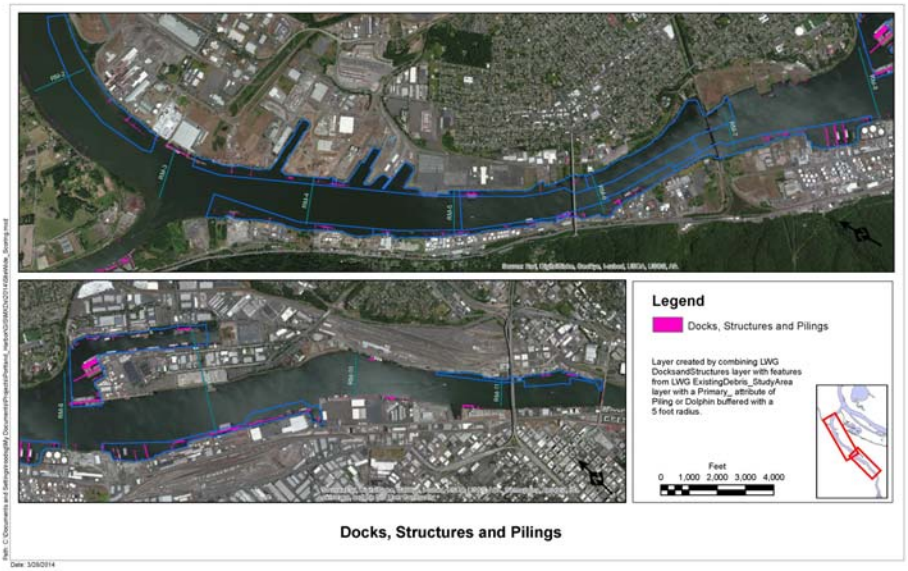
Anthropogenic – Docks, structures and pilings



Docks, Structures and Pilings

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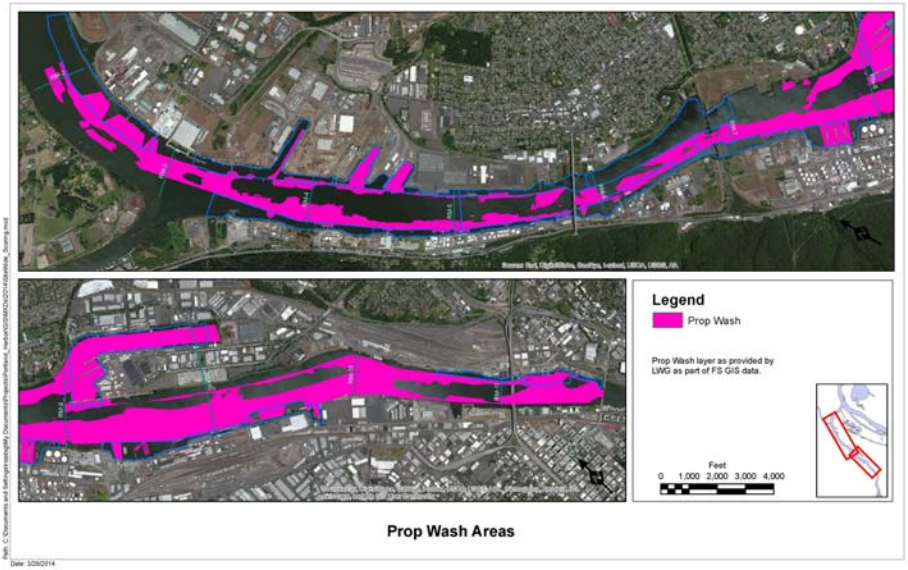
Anthropogenic – Prop Wash Areas



Prop Wash Areas

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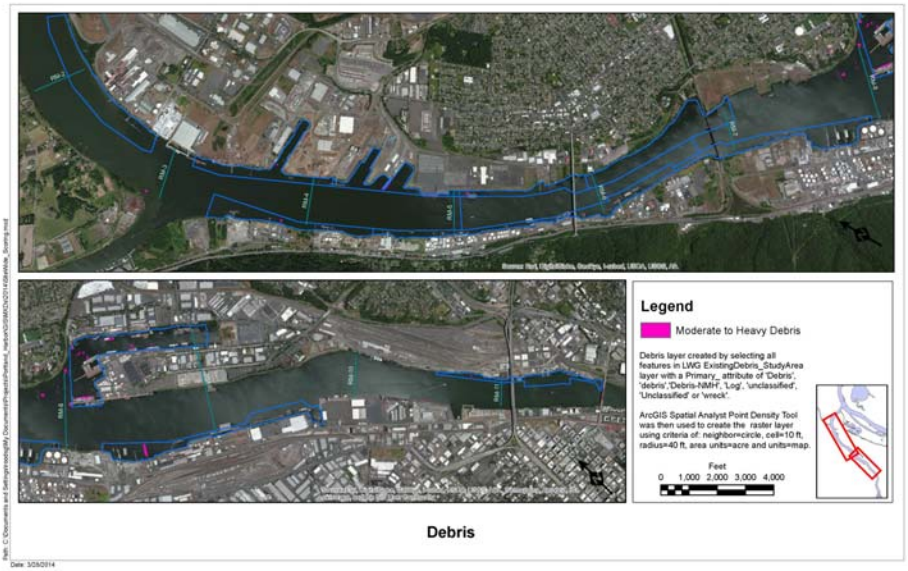
Anthropogenic - Debris



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Example Areas

- Present four areas with technology assignment in LWG's E footprint.
  - LWGi
  - LWGr
  - EPA

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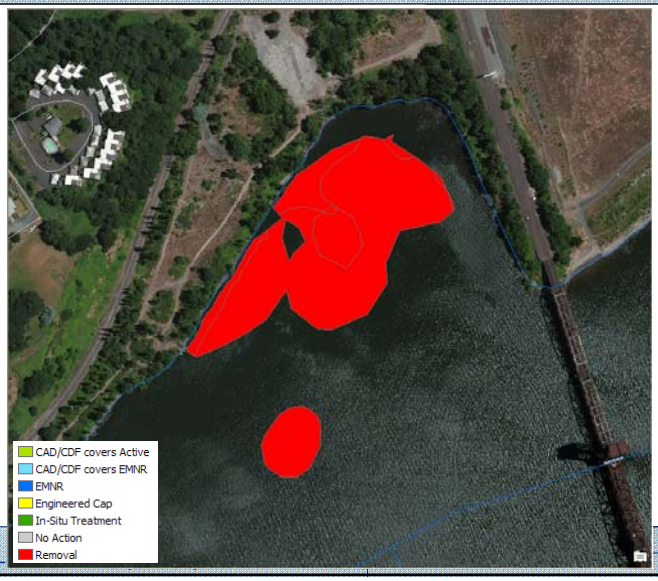
Willamette Cove Area LWG Alt E Removal Focused



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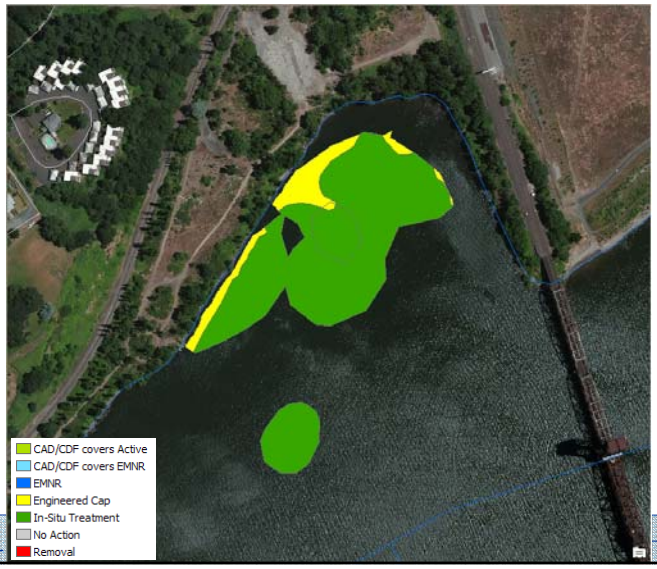
Willamette Cove Area LWG Alt E Integrated Focused



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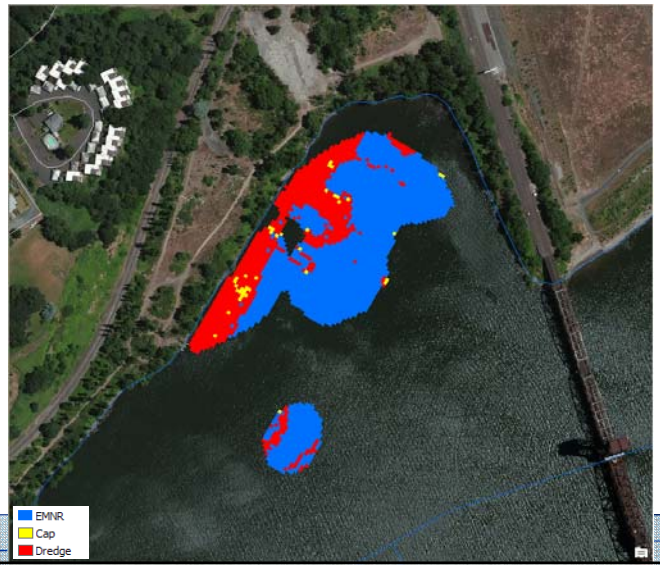
Willamette Cove Area EPA Scoring over LWG Alt E SMA



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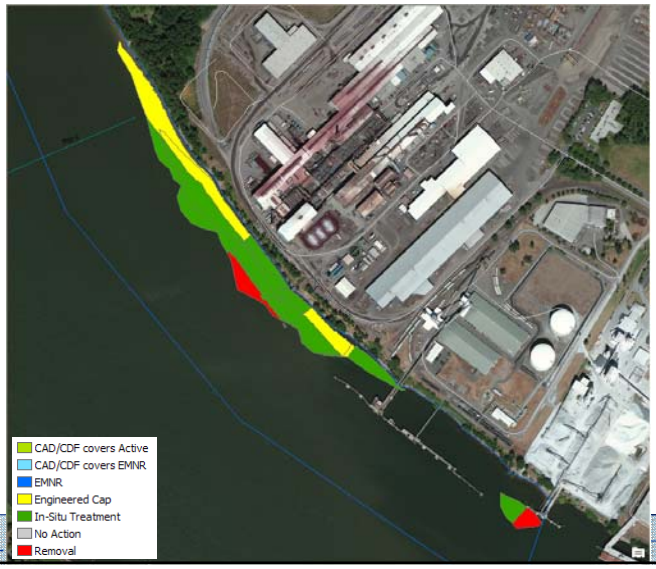
RM 2E Area LWG Alt E Removal Focused

Draft Pre-Decisional --

RM 2E Area LWG Alt E Integrated Focused



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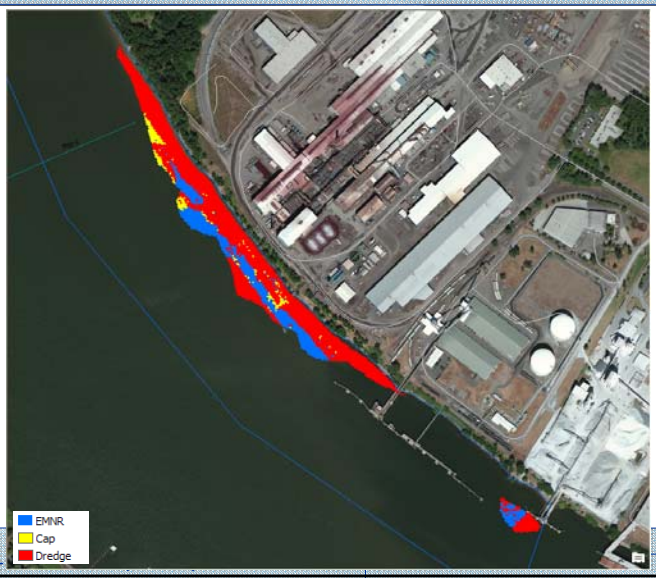
RM 2E Area EPA Scoring on LWG SMAs Alt E



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RM 6-7W Area LWG Alt E Removal

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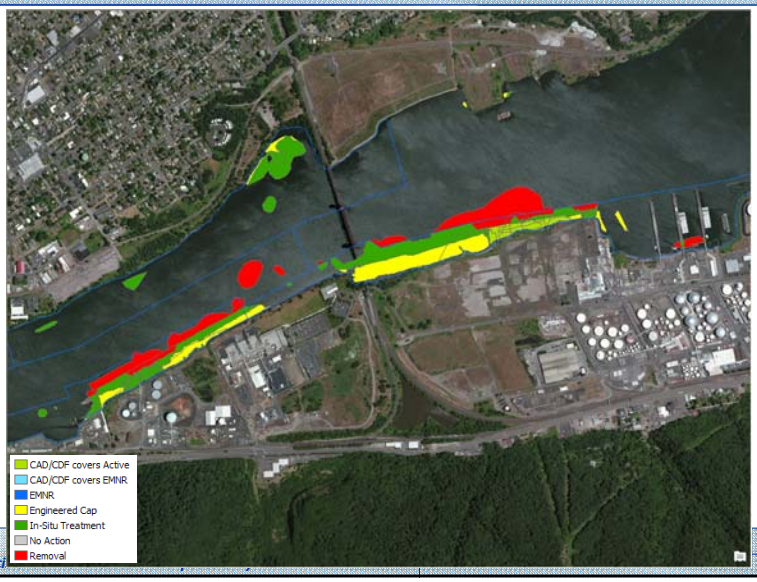
RM 6-7W Area LWG Alt E Integrated



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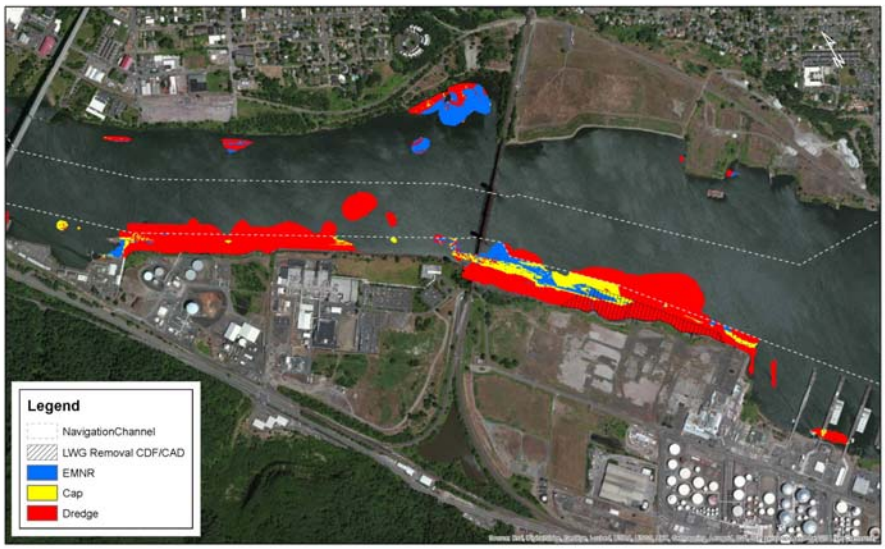
RM 6-7W Area EPA Scoring on LWG SMAs Alt E



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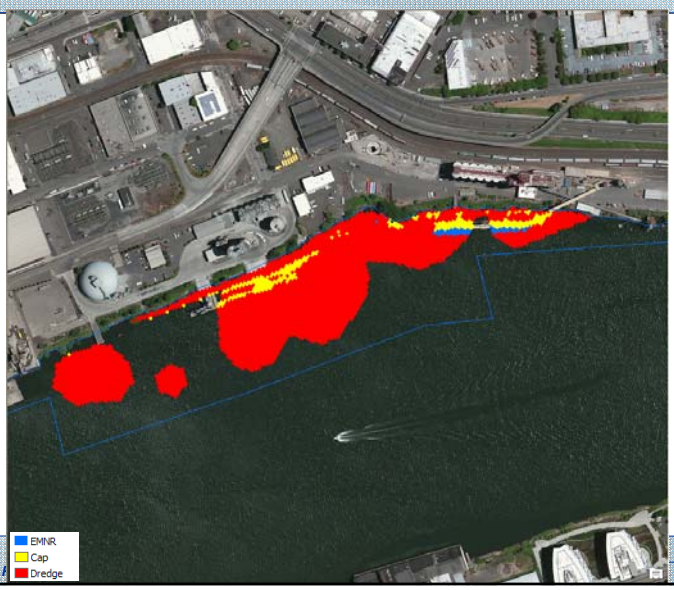
RM 11E Area LWG Alt E Removal

Draft Pre-Decisional – F

RM 11E Area LWG Alt E Integrated

Draft Pre-Decisional – I

RM 11E Area EPA Scoring on LWG SMAs Alt E



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Technology Assignment Comparison

Focus on Alternative E

Excludes
Swan Island EMNR area
Area under CAD/CDFs

Total Size of LWG SMA's: 170 Acres

Nav Channel + FMD: 93.73 Acres

Remainder: 76.35 Acres

	Dredge	Cap	EMNR
LWG-I	0.0	21.7	54.6
LWG-R	65.6	10.6	0.13
EPA	46.1	19.5	10.7

The "diagnostics" should evaluate why these X acres were selected for dredging; i.e. what criteria scored.

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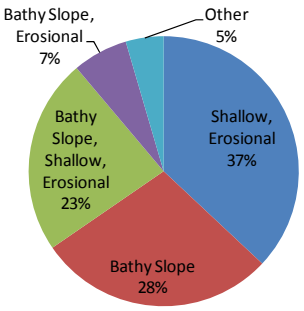
Criteria Driving Dredge Determination

- In areas outside "off-ramps", dredging was selected due to these criteria:



- Primary drivers were: erosional, bathy slope, and shallow.
- Generally, multiple LoEs; single LoE in 32% of areas.

(Analysis uses LWG footprints for RAL E. Areas under CAD/CDF footprint not included)

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Technology Assignment Use and Consideration

- Approach is appropriate for an FS-level determination
- If there are small, isolated areas of technology assignments within another technology, or assignments are interspersed, it would be expected that these areas would be smoothed and refined in remedial design
  - e.g., a single cap pixel in a dredge area
- A "dredge" assignment may be most appropriate as a dredge/cap.
  - e.g.; in shallow areas adjacent to shoreline, where dredging may destabilize shorelines or increase in depth is not desired, a dredge/cap remedy would be appropriate

Caveats

- Additional work/revisions being done on "scoring" layers
- Technology assignments will need to consider:
  - Future land use designations (e.g. habitat)
  - Mitigation (onsite* vs. offsite)
  - Floodway/rise/storage analysis
  - Vertical extent considerations
- Near shore work needs to be integrated with bank work
- Process indicates appropriate technology based on analysis… **It does not select a remedy**.

*Cost and other implications (e.g. hard vs. soft banks, slopes, type of caps in final design, etc.)

Questions?